

ENGLISH

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HELP

REPORT

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**Notes:**

1. Untranslatable words are replaced with asterisks (\* \* \* \* \*).
2. Texts in the figures are not translated and shown as it is.

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[Document Name] Description

[Title of the Invention] An organic light conductivity compound and the electronic photograph photo conductor using it

[Claim(s)]

[Claim 1] The organic light conductivity compound shown by the following general formula (1).  
[Chemical formula 1]

(In a general formula (1), R1 shows a hydrogen atom, a low-grade alkyl group, a lower alkoxy group, or a halogen atom, m shows the integer of 3-6, and n shows 1 or 2.)

[Claim 2] The organic light conductivity compound shown by the following general formula (2).  
[Chemical formula 2]

(In a general formula (2), R2 shows a hydrogen atom, a low-grade alkyl group, a lower alkoxy group, or a halogen atom, p shows the integer of 3-6, and q shows 1 or 2.)

[Claim 3] The electronic photograph photo conductor characterized by having the photosensitive layer containing at least one sort of the organic light conductivity compound shown by the above-mentioned general formula (1) or (2) on a conductive base material.

[Claim 4] The electronic photograph photo conductor according to claim 3 which a photosensitive layer contains an electric charge generating substance and an electric charge transportation substance, and is characterized by this electric charge transportation substance being at least one sort of the organic light conductivity compound shown by the above-mentioned general formula (1) or (2).

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a new organic light conductivity compound and the electronic photograph photo conductor using it.

[0002]

[Description of the Prior Art] The application to the high speed printer which use of an electronic photograph method spreads to the field for which photograph technology was used in the former, such as not only the field of a copying machine but printing plate material, a slide film, a microfilm, etc., and makes laser, LED, and CRT a light source is also considered in recent years. Moreover, by these days, the application to uses other than the electronic photograph photo conductor of an optical conductivity material, for example, an electrostatic record element, a sensor material, EL element, etc. also began to be considered. Therefore, the demand to an optical conductivity material and the electronic photograph photo conductor using it is also becoming broad at an altitude. As a photo conductor of an electronic photograph method, the optical conductivity substance of an inorganic system, for example, selenium, a cadmium sulfide, a zinc oxide, silicon, etc. are known until now, and it inquires widely and is put in practical use. As soon as the inorganic matter has many strong points, these also have various faults. For example, there is a fault of manufacture conditions being difficult for selenium and being easy to crystallize with heat or a mechanical shock, and a cadmium sulfide and a zinc oxide have difficulty in moisture resistance and endurance. Shortage of electrostatic property and manufacturing difficulty are pointed out about silicon. Furthermore, there is also a toxic problem in selenium or a cadmium sulfide.

[0003] on the other hand, it is good, and membrane formation nature is excellent also in flexibility, and is lightweight, and the transparency of nature is also good, and it is suitable for the optical conductivity substance of an organic system -- increase -- admiration -- a method -- the design of the photo conductor to a wide range wavelength band is easy -- etc. -- the utilization is capturing the spotlight gradually from having an advantage.

[0004] By the way, the following [ photo conductor / which is used in electronic photograph technology ] as fundamental character generally is required. Namely, (1) That electrostatic property is

high to the corona discharge in a dark place, and (2) That there is little disclosure (dark attenuation) in the dark place of the obtained electrification electric charge, and (3) That loss (optical attenuation) of an electrification electric charge is prompt by irradiation of light, and (4) It is that there are few remains electric charges after optical irradiation etc.

[0005] However, although many researches have been made about optical conductive polymers including Pori vinyl KARUBAZORU till today as an organic system light conductivity substance These are hard to be referred to as that coat nature, flexibility, and adhesiveness not necessarily possess the fundamental character as an above-mentioned photo conductor fully.

[0006] On the other hand, [ compound / of an organic system / low-molecular light conductivity ] By choosing the binder used for photo conductor formation, there was a fault that it was difficult to find out a compound suitable for the ability to hold the characteristic of high sensitivity of what can obtain the photo conductor excellent in mechanical intensity, such as coat nature, and adhesiveness, flexibility.

[0007] In order to improve such a point, the organic photo conductor which made the electric charge generating function and the electric charge transportation function share with a different substance and which has the characteristic of high sensitivity is developed. The feature of such a photo conductor called the functional discrete type is the ability to choose a material suitable for each function from the large range, and since the photo conductor which has arbitrary performances can be produced easily, many researches have been advanced.

[0008] among these, as a substance which takes charge of an electric charge generating function The substance of varieties, such as a phthalocyanine pigment, a square RIUMU pigment, an azo pigment, and PERIREN paints, is examined, especially, it inquires widely from high electric charge generating efficiency of an azo pigment being expectable possible [ various molecular structure ], and utilization is also progressing. However, in this azo pigment, the relation between molecular structure and electric charge generating efficiency is not yet clear. Although the actual condition repeats synthetic huge research and is searching for the optimal structure, what fully satisfies the demand of fundamental character, high endurance, etc. which are searched for as the place by the present and a photo conductor hung up previously is not yet obtained.

[0009] On the other hand, an electron hole transportation substance and an electronic transportation substance are one of the substances which take charge of an electric charge transportation function. Although the substance of varieties, such as 2, 4, a 7-trinitro 9-fluorenone, and a diphenoquinone derivative, is examined as electronic transportation substances, such as a HIDORAZON compound and a SUCHIRUBEN compound, as an electron hole transportation substance and utilization is also progressing The actual condition is that repeat synthetic huge research also here and it is searching for the optimal structure. In fact, although many improvement has so far been made, what fully satisfies the

demand of fundamental character, high endurance, etc. which are searched for as a photo conductor hung up previously is not yet obtained.

[0010] As stated above, various improvement has accomplished for production of an electronic photograph photo conductor, but the present condition is that what fully satisfies the demand of fundamental character, high endurance, etc. which are demanded as a photo conductor hung up previously is not yet obtained.

[0011]

[Problem to be solved by the invention] When it uses as a material of an electronic photograph photo conductor, even if electrification potential is high sensitivity highly and uses it repeatedly, many characteristics do not change but can demonstrate the stable performance, and also the purpose of this invention is to provide a sensor material, EL element, an electrostatic record element, etc. with an usable new organic light conductivity compound.

[0012]

[Means for solving problem] As a result of studying an organic light conductivity compound that the above-mentioned purpose should be attained, this invention persons found out that the organic light conductivity compound which has a specific structure was effective, and resulted in this invention. The screw in DORU system compound indicated to be the organic light conductivity compound which has a specific structure above by the following general formula (1) is raised.

[0013]

[Chemical formula 3]

[0014] In a general formula (1), R1 shows a hydrogen atom, a low-grade alkyl group, a lower alkoxy group, or a halogen atom, m shows the integer of 3-6, and n shows 1 or 2.

[0015] Furthermore, the screw indoline system compound shown by the following general formula (2) is

raised as an organic light conductivity compound which has a specific structure of this invention.

[0016]

[Chemical formula 4]

[0017] In a general formula (3), R2 shows a hydrogen atom, a low-grade alkyl group, a lower alkoxy group, or a halogen atom, p shows the integer of 3-6, and q shows 1 or 2.

[0018] As an example of R1 and R2 here A hydrogen atom, a methyl group, an ethyl group, Halogen atoms, such as lower alkoxy groups, such as low-grade alkyl groups, such as n-propyl group, an iso propyl group, and n-butyl group, a methoxy group, an ethoxy basis, n-propoxy group, and an n-butoxy machine, or a fluoride atom, a chlorine atom, and a bromine atom, etc. can be mentioned.

[0019] Moreover, m and p show the integer of 3-6, and n and q show 1 or 2, respectively.

[0020]

[Mode for carrying out the invention] Although the screw in DORU system compound of EA-01 - 20 shown below can be mentioned as an example of the organic light conductivity compound shown by the general formula (1) in connection with this invention, it is not limited to these.

[0021]

[Chemical formula 5]

[0022]

[Chemical formula 6]

[0023]

[Chemical formula 7]

[0024]

[Chemical formula 8]

[0025] Moreover, although the screw indoline system compound of EB-01 - 20 shown below can be mentioned as an example of the organic light conductivity compound shown by the general formula (2) in connection with this invention, it is not limited to these.

[0026]

[Chemical formula 9]

[0027]

[Chemical formula 10]

[0028]

[Chemical formula 11]

[0029]

[Chemical formula 12]

[0030] The screw in DORU system compound shown by the general formula (1) in this invention is easily compounded by the following synthetic pathway.

[0031] namely, p-dihalogen substitution benzene expressed in the 0.5mol Eq following general formula (4) as the Indore compound shown by the following general formula (3) to (3) -- or [ p and p'-dihalogen substitution BIFENIRU expressed with the following general formula (5) ] Using high-boiling point solvents, such as a non-solvent or nitroglycerine benzene, and Sour Follain, add bases, such as

potassium carbonate (1.0molEq - 1.5mol Eq) and sodium carbonate, and further as a catalyst adding \*\*\*\* of 1 values, such as metal copper or a cuprous chloride, the first copper of bromination, and the first copper of iodination, -- 200-300-degree C high temperature -- warming -- it is [ the bottom ] easily compoundable by making it react for about 5 to 24 hours.

[0032]

[Chemical formula 13]

[0033]

[Chemical formula 14]

[0034]

[Chemical formula 15]

[0035] R1 and m in the above-mentioned general formula (3) are the same as the screw in DORU system compound shown by a general formula (1), and the above-mentioned general formula (4) and X of (5) express the bromine atom or the halogen atom of iodine atom.

[0036] The indoline compound shown by the following general formula (6) is used for the screw indoline system compound shown by the general formula (2) in this invention instead of the Indore compound of the above-mentioned general formula (3), and it can compound it easily by performing the same reaction as the above.

[0037]

[Chemical formula 16]

[0038] [ moreover, the screw indoline system compound shown by a general formula (2) ] The screw in DORU system compound of a general formula (1) with which structure corresponds Methanol, Cyclic ether system solvents, such as alcoholic solvent, such as ethanol, or JIOKISAN, and a dioxo run, are used. Using 5% palladium carbon etc. as a catalyst, contact reduction by hydrogen gas is performed under normal pressure or pressurization, and it can compound easily also by returning the double bond of two Indore portions of a general formula (1).

[0039] R2 and p in the above-mentioned general formula (6) are the same as the screw indoline system compound shown by a general formula (2).

[0040] [ the Indore compound shown by the general formula (3) used as the synthetic materials of the above-mentioned reaction ] Journal of Chemical [ with the method of 123 volumes and a 3242-3247-page description ] in Society and 1923 It is obtained with sufficient \*\*\*\* and the indoline compound of a general formula (6) is Journal. of Chemical It will be obtained [ 2302-2311-page ] with sufficient \*\*\*\* by the method of a description in Society and 1958. Moreover, also as for the thing of iodine atom, X is [ the thing of a bromine atom ] available about both the general formula (4) which is one synthetic materials, and the compound of (5) as a commercial reagent.

[0041] The any can also be used for the form of the electronic photograph photo conductor containing the photosensitive layer containing the organic light conductivity compound shown by the general formula (1) of this invention, or (2). For example, there are some which prepared the photosensitive layer which consists of an electric charge generating substance, an electric charge transportation substance, and film formation nature binder resin on the conductive base material. Moreover, the laminated type photo conductor which prepared the electric charge generating layer which consists of an electric charge generating substance and binder resin, and the electric charge transportation layer which consists of an electric charge transportation substance and binder resin on the conductive base material is also known. As for an electric charge generating layer and an electric charge transportation layer, whichever may serve as the upper layer. Moreover, if needed, while being a conductive base material and a photosensitive layer, in the case of a laminated type photo conductor, an intermediate layer can also be prepared [ a bottom influence layer ] for an overcoat layer in the photo conductor surface between an electric charge generating layer and an electric charge transportation layer. As a base material which produces a photo conductor using the compound of this invention, the base material of the shape of a sheet of metal drums, a metal plate, the paper that gave conductive processing, or a plastic film, the shape of a drum, or the shape of a belt etc. is used.

[0042] The electronic photograph photo conductor of this invention is obtained one kind or by containing two or more kinds, respectively in the organic light conductivity compound shown by a general formula (1) or (2), and an electric charge generating substance. electric charge generating substances include an inorganic system electric charge generating substance and an organic system electric charge generating substance -- as the former example -- for example, selenium, a selenium

TERURU alloy, and \*\*\*\*\*\_\*\* -- base -- an alloy, a cadmium sulfide, a zinc oxide, amorphous silicone, etc. are mentioned. As an example of an organic system electric charge generating substance, for example Methyl violet, brilliant green, Thiazin dyes, such as triphenylmethane dye, such as crystal violet, and methylene blue, Quinone dye, such as KINIZARIN, cyanine dye, AKURIJIN dye, a PIRIRIUMU pigment, The phthalocyanine pigment of a thia PIRIRIUMU pigment, a square RIUMU pigment, PERINON system paints, anthraquinone system paints, PERIREN system paints, metal content, or non-metal etc. is mentioned, and an azo pigment is also used.

[0043] As an azo pigment, for example JP,S47-37543,A, JP,S53-95033,A, JP,S53-132347,A, JP,S53-133445,A, JP,S54-12742,A, JP,S54-20736,A, JP,S54-20737,A, JP,S54-21728,A, JP,S54-22834,A, JP, S55-69148,A, JP,S55-69654,A, JP,S55-79449,A, JP,S55-117151,A, JP,S56-46237,A, JP,S56-116039,A, JP,S56-116040,A, JP,S56-119134,A, JP,S56-143437,A, JP,S57-63537,A, JP,S57-63538,A, JP,S57-63541,A, JP,S57-63542,A, JP,S57-63549,A, JP,S57-66438,A, JP,S57-74746,A, JP,S57-78542,A, JP, S57-78543,A, JP,S57-90056,A, JP,S57-90057,A, JP,S57-90632,A, JP,S57-116345,A, JP,S57-202349,A, JP,S58-4151,A, JP,S58-90644,A, JP,S58-144358,A, JP,S58-177955,A, JP,S59-31962,A, JP,S59-33253,A, JP,S59-71059,A, JP,S59-72448,A, JP,S59-78356,A, JP,S59-136351,A, JP,S59-201060,A, JP,S60-15642,A, JP,S60-140351,A, JP,S60-179746,A, JP,S61-11754,A, JP,S61-90164,A, JP,S61-90165,A, JP,S61-90166,A, JP,S61-112154,A, JP,S61-269165,A, JP,S61-281245,A, JP,S61-51063,A, JP,S62-267363,A, JP,S63-68844,A, JP,S63-89866,A, JP,S63-139355,A, JP,S63-142063,A, JP,S63-183450,A, JP,S63-282743,A, JP,S64-21455,A, JP,S64-78259,A, JP,H1-200267,A, JP,H1-202757,A, JP,H1-319754,A, JP,H2-72372,A, JP,H2-254467,A, JP,H3-95561,A, JP,H3-278063,A, JP,H4-96068,A, The compound of a description is mentioned to JP, H4-96069,A, JP,H4-147265,A, JP,H5-142841,A, JP,H5-303226,A, JP,H6-324504,A, JP,H7-168379,A, etc.

[0044] Moreover, it goes across the structure of the Kapler ingredient where it is used for these azo pigments, variably. For example, JP,S54-17735,A, JP,S54-79632,A, JP,S57-176055,A, JP,S59-197043,A, JP,S60-130746,A, JP,S60-153050,A, JP,S60-103048,A, JP,S60-189759,A, The compound of a description is mentioned to JP,S63-131146,A, JP,S63-155052,A, JP,H2-110569,A, JP,H4-149448,A, JP,H6-27705,A, JP,H6-348047,A, etc.

[0045] Although the compound shown in the following tables 1-45 can be mentioned as an example of the above-mentioned azo pigment, it is not limited to these. Moreover, it is also possible to use together these compounds and other electric charge generating substances.

[0046]

[Table 1]

[0047]

[Table 2]

[0048]

[Table 3]

[0049]

[Table 4]

[0050]

[Table 5]

[0051]

[Table 6]

[0052]

[Table 7]

[0053]

[Table 8]

[0054]

[Table 9]

[0055]

[Table 10]

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[Table 11]

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[Table 29]

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[Table 34]

[0080]

[Table 35]

[0081]

[Table 36]

[0082]

[Table 37]

[0083]

[Table 38]

[0084]

[Table 39]

[0085]

[Table 40]

[0086]

[Table 41]

[0087]

[Table 42]

[0088]

[Table 43]

[0089]

[Table 44]

[0090]

[Table 45]

[0091] As phthalocyanine pigment used in this invention Its either well-known phtalo SHIANIN or derivative can use it in itself, and specifically Non-metal phtalo SHIANIN, titanyloxyphthalocyanine, and copper phtalo SHIANIN Aluminum phtalo SHIANIN and JIFENOKISHI germanium phtalo SHIANIN Germanium phtalo SHIANIN, gallium phtalo SHIANIN, and chloro gallium phtalo SHIANIN Bromo gallium phtalo SHIANIN and chloro indium phtalo SHIANIN Bromo indium phtalo SHIANIN and iodine indium phtalo SHIANIN Magnesium phtalo SHIANIN and chloro aluminum phtalo SHIANIN Bromo aluminum phtalo SHIANIN, tin phtalo SHIANIN, and dichlorotin phtalo SHIANIN Vanadyl OKISHIFUTAROSHIANIN, zinc phtalo SHIANIN, and Cobalt phtalo SHIANIN Nickel phtalo SHIANIN and hydroxy gallium phtalo SHIANIN Dihydroxy gallium phtalo SHIANIN, barium phtalo SHIANIN, beryllium phtalo SHIANIN, cadmium phtalo SHIANIN, chloro cobalt phtalo SHIANIN, dichloro titanylphthalocyanine, and iron phtalo SHIANIN Silicon phtalo SHIANIN, lead phtalo SHIANIN, platinum phtalo SHIANIN, non-metal naphthalocyanine, aluminum naphthalocyanine, titanyl OKISHI naphthalocyanine, RUTENIUMUFUTAROSHIANIN, palladium phtalo SHIANIN, etc. are mentioned. Also in it Non-metal phtalo SHIANIN, titanyloxyphthalocyanine, [ especially ] Copper phtalo SHIANIN, chloro aluminum phtalo SHIANIN, chloro indium phtalo SHIANIN, vanadyl OKISHIFUTAROSHIANIN, JIFENOKISHI germanium phtalo SHIANIN, chloro gallium phtalo SHIANIN, and hydroxy gallium phtalo SHIANIN are preferably used by this invention.

[0092] Moreover, phthalocyanine pigment is known as a compound of crystal many models, and the phthalocyanine pigment of various crystallized types is found out. As description about these crystallized types and manufacture methods, [ non-metal phtalo SHIANIN ] JP,S49-4338,B, JP,S58-182639,A, JP,S60-19151,A, JP,S62-47054,A, JP,S62-143058,A, JP,S63-286857,A JP,H1-138563,A, JP,H1-230581,A, JP,H2-233769,A, and the thing further indicated to J.Phys.Chem.72 and 3230 (1968) can be mentioned.

[0093] Titanyloxyphthalocyanine JP,S61-217050,A, JP,S62-67094,A, JP,S62-229253,A, JP,S63-364,A, JP,S63-365,A, JP,S63-366,A, JP,S63-37163,A, JP,S63-80263,A, JP,S63-116158,A, JP,S63-198067,A, JP,S63-218768,A

JP,S64-17066,A, JP,H1-123868,A, JP,H1-138562,A, JP,H1-153757,A, JP,H1-172459,A, JP,H1-172462,A, JP,H1-189200,A, JP,H1-204969,A, JP,H1-207755,A, JP,H1-299874,A, JP,H2-8256,A, JP,H2-99969,A, JP,H2-131243,A, JP,H2-165156,A, JP,H2-215866,A, JP,H2-267563,A, JP,H2-297560,A, JP,H3-35064,A, JP,H3-54264,A, JP,H3-84068,A, JP,H3-94264,A, JP,H3-100658,A, JP,H3-100659,A, JP,H3-123359,A, JP,H3-199268,A, JP,H3-200790,A, JP,H3-269064,A, JP,H4-145166,A, JP,H4-145167,A, JP,H4-153273,A, JP,H4-159373,A, JP,H4-179964,A, JP,H5-202309,A, JP,H5-279592,A, JP,H5-289380,A, JP,H6-336554,A, JP,H7-82503,A, JP,H7-82505,A

What is further indicated to JP,H8-110649,A can be mentioned.

[0094] moreover, the thing copper phthalo SHIANIN is indicated to be to JP,S52-1667,B, JP,S51-108847,A, and JP,S55-60958,A -- gamma type, pi type, chi type, rho type, etc. are known further, and these can be mentioned. Chloro aluminum phthalo SHIANIN JP,S58-158649,A, Chloro indium phthalo SHIANIN is JP,S59-44054,A and JP,S60-59355,A to JP,S62-133462,A, JP,S62-163060,A, JP,S63-43155,A, and also JP,S64-70762,A.

To JP,S61-45249,A and also JP,H7-13375,A, [ vanadyl OKISHIFUTAROSHIANIN ] JP,S63-18361,A, JP,H1-204968,A, JP,H1-268763,A, To JP,H3-269063,A and also JP,H7-247442,A, [ JIFENOKISHI germanium phthalo SHIANIN ] To JP,H4-360150,A, [ chloro gallium phthalo SHIANIN ] Hydroxy gallium phthalo SHIANIN can mention JP,H5-263007,A and the thing further indicated to JP,H7-53892,A to JP,H5-194523,A and also JP,H7-102183,A.

[0095] As film formation nature binder resin used in order to form the photosensitive layer containing the organic photoconductive nature compound shown by the general formula (1) of this invention, or (2), various things are raised according to a field of the invention. For the use of the photo conductor for a copy, for example, polystyrene resin, polyvinyl acetal resin, Polysulfone resin, polycarbonate resin, vinegar BI crotonic acid copolymer resin, polyester resin, Pori FENIREN oxide resin, polyarylate resin, alkyd resin, an acrylic resin, methacrylic resin, FENOKISHI resin, or polyvinyl chloride resin is mentioned. Also in these, polystyrene resin, polyvinyl acetal resin, polycarbonate resin, polyester resin, polyarylate resin, etc. are excellent in the potential characteristic as a photo conductor. Moreover, any of independent or a copolymer are sufficient as these resin, and it can mix these one sort or two sorts or more, and can be used. As for the quantity applied to the optical conductivity compound of these binder resin, 20 to 1000 weight % is desirable, and its 50 to 500 weight % is more desirable.

[0096] In the case of a laminated type photo conductor, as for these resin contained in an electric charge generating layer, 10 to 500 weight % is desirable to an electric charge generating substance, and its 50 to 150 weight % is more desirable. If the ratio of resin becomes high too much, electric charge generating efficiency will fall, and if the ratio of resin becomes low too much, a problem will arise to membrane formation nature. Moreover, as for these resin contained in an electric charge transportation layer, 20 to 1000 weight % is desirable to an electric charge transportation substance, and its 50 to 500 weight % is

more desirable. If the ratio of resin is too high, sensitivity will fall, and when the ratio of resin becomes low too much, there is a possibility of causing aggravation of the characteristic and the deficit of a coat repeatedly.

[0097] It pulls and bends and some of these resin are weak in mechanical intensity, such as compression. In order to improve this character, the substance which gives reversibility can be added. Specifically, phthalate ester (for example, DOP, DBP, etc.), phosphoric ester (for example, TCP, TOP, etc.), sebacic acid ester, adipic acid ester, nitrile rubber, chlorinated hydrocarbon, etc. are mentioned. Since these substances will have the bad influence of electrophotographic properties if it adds more than needed, as for the rate, 20 or less weight % is desirable to binder resin.

[0098] In addition, an antioxidant, a curl prevention agent, etc. can add a leveling agent etc. if needed for improvement of coating nature as an additive to the inside of a photo conductor.

[0099] The compound shown by a general formula (1) or (2) can be used combining the electric charge transportation substance of further others. Electric charge transportation substances include an electron hole transportation substance and an electronic transportation substance. The oxadiazole shown, for example in JP,S34-5466,B etc. as a former example The bird phenyl methane shown in JP,S45-555,B etc. The oxadiazole shown in HIDORAZON shown in PIRAZORIN shown in JP,S52-4188,B etc., JP, S55-42380,B, etc., JP,S56-123544,A, etc. can be mentioned. On the other hand as an electronic transportation substance, for example KURORANIRU, tetracyano ethylene, Tetracyano KINOJI methane, 2 and 4, a 7-trinitro 9-fluorenone, There are 2, 4, 5, a 7-tetra-nitroglycerine 9-fluorenone, 2, 4 and 5, 7-tetra-nitroglycerine KISANTON, 2 and 4, a 8-trinitro thioxan ton, 1 and 3, 7-bird NITOROJI benzothiophene, 1 and 3, 7-bird NITOROJI benzothiophene 5, 5-dioxide, etc. these electric charge transportation substances are independent -- or two or more sorts can be combined and it can use.

[0100] moreover -- forming the compound and charge transfer complex which are shown by a general formula (1) or (2) -- further -- increase -- admiration -- an effect -- it is made to increase -- increase -- admiration -- an agent -- \*\*\*\*\* -- a certain kind of electronic suction nature compound can also be added. As this electronic suction nature compound, for example, 2, 3-dichloro 1, 4-naphth quinone, 1-nitroglycerine anthraquinone, 1-chloro 5-nitroglycerine anthraquinone, Quinone, such as 2-chloro anthraquinone and phenan TOREN quinone, Aldehyde, such as 4-nitroglycerine benzoic aldehyde, 9-benzoIRUANTORASEN, Ketone, such as Indang dione, 3, 5-dinitro benzoFENON, 3, 3', 5, and 5'-tetra-nitrobenzo FENON, Acid anhydrides, such as a phthalic anhydride and 4-chloro naphthalic acid anhydride, tele lid RARUMARONO nitril, 9-anthryl methylidyne MARONO nitril, 4-nitroglycerine BENZARUMARONO nitril, Cyano compounds, such as 4-(p-nitrobenzoyloxy) BENZARUMARONO nitril, FUTARIDO, such as 3-BENZARUFUTARIDO, 3-(alpha-cyano p-nitroglycerine BENZARU) FUTARIDO, 3-(alpha-cyano p-nitroglycerine BENZARU)-4, 5 and 6, and 7-tetra-chloro FUTARIDO, can be mentioned.

[0101] The organic light conductivity compound of this invention embraces the form of a photo conductor, it dissolves or distributes in a suitable solvent with the above-mentioned various quality of an additive, and it is applied on the conductive base material which described the coating liquid previously, and it can dry and it can manufacture a photo conductor.

[0102] As an application solvent, chloroform, dichloro ethane, a methylene chloride, Halogenated hydrocarbon, such as trichloroethane, trichloroethylene, chloro benzene, and dichloro benzene, Aromatic hydrocarbon, such as benzene, toluene, and xylene, JIOKISAN, Ethers solvents, such as a tetrahydro franc, methyl cellosolve, ethylcellosolve, and ethylene glycol dimethyl ether, Methyl ethyl ketone, methyl isobutyl ketone, methyl isopropyl ketone, Esters solvents, such as ketone system solvents, such as cyclohexa non, ethyl acetate, methyl formate, and methyl cellosolve acetate, Alcohols solvents, such as aprotic polar solvents, such as N and N-JIMECHIRUHORUMU amide, acetonitrile, N-MECHIRU pylori boss, and dimethyl sulfoxide, and n-butanol, and 2-propanol, etc. can be mentioned. These solvents can be used as independent or two or more sorts of partially aromatic solvents.

[0103]

[Working example] Next, although a work example explains this invention still in detail, this invention is not limited to these at all.

[0104]

[Chemical formula 17]

[0105]

[Chemical formula 18]

[0106] Synthetic example 1 5.1g of diiodo compounds shown by the synthetic above (7) of an illustration compound (EA-11), After mixing well 4.72g of Indore compounds shown above (8), 4.9g of potassium carbonate, and 0.16g of bromination first copper, it heats at 200 degrees C for 7 hours, adding and agitating Sour Follain 25ml. After returning reaction liquid to room temperature, it pours into 300ml of water, and an insoluble crystal is separated. Ethyl acetate was sufficient, this was refined by silica gel column chromatography (elution solvent: chloro form), after carrying out distributed washing, it re-crystallized in the chloro form further, and 1.77g of the target compounds (EA-11) were obtained. \*\*\*\*

was 30.2% and the melting point was 259-266 degrees C.

[0107] Synthetic example 2 Making 1.13 (EA-11)g and the 5% palladium carbon 0.17g which were compounded in the example 1 of synthetic composition of the illustration compound (EB-11) \*\*\*\* into the mixed-solution (JIOKISAN50ml and methanol 20ml), and agitating them under room temperature, hydrogen gas is introduced in normal pressure and contact reduction is carried out. (Reaction time: 72 hours) After checking the end of a reaction by a gas chromatograph, reaction liquid is filtered, and the solvent of \*\*\*\* is distilled off under decompression, the obtained oil is neglected, and it is made to crystallize. Distributed washing of this was carried out by ethanol, it dried and 0.37g of the target compounds (EB-11) were obtained. \*\*\*\* was 33% and the melting point was 186-190 degrees C.

[0108] The work-example 1 azo-pigment (K-1) 1 weight part and the polyester resin (Toyobo Byron 200) 1 weight part were mixed with the tetrahydro franc 100 weight part, and paint conditioner equipment distributed with the glass bead for 2 hours. in this way, the obtained dispersion liquid -- an application -- in KETA, it applied on aluminum vapor deposition polyester, and dried, and the electric charge generating layer of about 0.2 micrometer of film thickness was formed. next -- mixing an illustration compound (EA-11) with polyarylate resin (Unitika U-polymer) by the bulk density of 1:1, and making 10weight % of solution by using dichloro ethane as a solvent -- the above-mentioned electric charge generating layer top -- an application -- it applied by KETA and the electric charge transportation layer of about 20 micrometers of film thickness was formed.

[0109] Thus, about the produced laminated type photo conductor, electrophotographic properties were evaluated using electrostatic record test equipment (product SPmade from Kawaguchi electrical machinery-428). measurement condition: -- impressed-electromotive-force-static 6kV -- No.3 (rotation speed mode of a turntable: 10 m/min). As a result, electrification potential (V0) showed the value of 1.5 lux and a second, and high sensitivity. [ light exposure / (E1/2) / -720V reduction-by-half ]

[0110] Furthermore, characteristic evaluation to the repetition use which makes 1 cycle electrification-electric discharge (electric-discharge light: white light 400 lux x 1-second irradiation) was performed using this equipment. When asked for change of the electrification potential by the repetition by 5000 times, to 1st electrification potential (V0)-720V, the 5000th electrification potential (V0) is -715V, and showed the characteristic which does not almost have the fall of the potential by repetition and was stabilized. Moreover, the characteristic where the 5000th reduction-by-half light exposure (E1/2) does not have 1.5 lux and a second, and change and which was excellent to the 1st 1.5 luxs of reduction-by-half light exposures (E1/2) and second was shown.

[0111] Instead of the azo pigment (K-1) of two to work-example 21 work example 1, and the illustration compound (EA-11), the azo pigment shown in Table 46 - 47, respectively and the compound of this invention were used, and also the photo conductor was produced like the work example 1, and the characteristic was evaluated. A result is shown in Table 46 - 47.

[0112]

[Table 46]

[0113]

[Table 47]

[0114] The distributed processing of a work-example 22 azo-pigment (J-1) 1 weight part and the tetrahydro franc 40 weight part was carried out with the glass bead with paint conditioner equipment for 8 hours. To the obtained dispersion liquid, an illustration compound (EA-11) In this way, 2.5 weight parts, the application after it adds a polycarbonate resin (Mitsubishi Gas Chemical PCZ-200) 10 weight part and a tetrahydro franc 60 weight part and paint conditioner equipment performs distributed processing for 30 minutes further -- it applied on aluminum vapor deposition polyester in KETA, and the photosensitive layer of about 15 micrometers of film thickness was formed. The electrophotographic properties of this photo conductor were evaluated like the work example 1. However, only impressed electromotive force was changed into +5kV. As a result, moreover, the outstanding characteristics with little change were indicated to be electrification potential (V0) +440V after the 1st electrification potential (V0) +450V, 1.6 luxs of reduction-by-half light exposures (E1/2) and a second, and 5000 times repetition, and 1.6 luxs of reduction-by-half light exposures (E1/2) and a second by high sensitivity.

[0115] Instead of the azo pigment (J-1) of 23 to work-example 42 work example 22, and the illustration compound (EA-11), the azo pigment shown in Table 48 - 49, respectively and the compound of this invention were used, and also the photo conductor was produced like the work example 22, and the characteristic was evaluated. A result is shown in Table 48 - 49.

[0116]

[Table 48]

[0117]

[Table 49]

[0118] [ the Bragg angle (2theta\*\*0.2 degree) over CuKalpha1.541 Å X-rays ] instead of the azo pigment (K-1) of 43 to work-example 52 work example 1 9.5 degrees, 9.7 degrees, 11.7 degrees, 15.0 degrees, 23.5 degrees, 24.1 degrees, [ the titanyloxyphthalocyanine (Y type titanyloxyphthalocyanine) which has the X diffraction spectrum which shows main peaks to 27.3 degrees ] The compound of this invention shown in Tables 50-51 instead of an illustration compound (EA-11), respectively was used, and also the photo conductor was produced like the work example 1, and the characteristic was evaluated. A result is shown in Tables 50-51.

[0119]

[Table 50]

[0120]

[Table 51]

[0121] The compound of this invention which shows Y type titanyloxyphthalocyanine in Tables 52-53 instead of an illustration compound (EA-11), respectively was used instead of the azo pigment (J-1) of 53 to work-example 62 work example 22, and also the photo conductor was produced like the work example 22, and the characteristic was evaluated. A result is shown in Tables 52-53.

[0122]

[Table 52]

[0123]

[Table 53]

[0124] [ used the comparison compound (R-1) shown below instead of an illustration compound (EA-11) as a comparative example 1 electric-charge transportation substance, and also ] As a result of producing a photo conductor by the same operation as a work example 1 and evaluating the characteristic, to 1st electrification potential (V0)-620V, the 5000th electrification potential (V0) is -430V, and the fall of the large potential by repetition was seen in the top where early electrification potential is bad. Moreover, as for the fall of 5.5 lux and a second, and sensitivity, the 5000th reduction-by-half light exposure (E1/2) was seen to the 1st 2.4 luxs of reduction-by-half light exposures (E1/2) and second.

[0125]

[Chemical formula 19]

[0126] The comparison compound (R-2-5) shown below instead of an illustration compound (EA-11) as an electric charge transportation substance was used like the comparative example 2, and also the photo conductor was produced by the same operation as a work example 1, and the characteristic was evaluated. As the result was shown in Table 54, it is all the things and the fall of sensitivity and the fall of the electrification potential by repetition were seen.

[0127]

[Chemical formula 20]

[0128]

[Chemical formula 21]

[0129]

[Chemical formula 22]

[0130]

[Chemical formula 23]

[0131]

[Table 54]

[0132]

[Effect of the Invention] As mentioned above, if the organic light conductivity compound of this invention is used so that clearly, the outstanding electronic photograph photo conductor which has high endurance by high sensitivity can be offered.

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[Translation done.]